

PROCESS FOR FORMING A DIFFUSION BARRIER MATERIAL NITRIDE FILM

[001] This is a continuation of U.S. Patent Application Serial No. 10/271,259, filed on October 15, 2002, ^{now Patent No. 6,689,685} which is a divisional of U.S. Patent Application Serial No. 09/812,099, filed on March 19, 2001, now U.S. Patent No. 6,479,381, which is a continuation of U.S. Patent Application Serial No. 08/862,685, filed on May 23, 1997, now U.S. Patent No. 6,204,171, which is a continuation-in-part of U.S. Patent Application Serial No. 08/653,428, filed on May 24, 1996, now U.S. Patent No. 5,633,200, which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. The Field of the Invention

[002] The present invention relates to the formation of a film substantially composed of a nitride of a diffusion barrier material situated on a semiconductor substrate. More particularly, the present invention is directed to the formation of a large grain diffusion barrier material nitride film situated on a semiconductor substrate in a process suitable for forming a diffusion barrier and for forming a refractory metal silicide stack structure with a diffusion barrier material nitride cover layer.

2. The Relevant Technology

[003] In the manufacturing of an integrated circuits upon a semiconductor substrate, barriers are often needed to prevent the diffusion of one material to an adjacent material. For instance, when aluminum contacts silicon surfaces, spiking can occur, and when aluminum comes into direct contact with tungsten, a highly resistive